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Michael W. Landry 5098 Seachase Street San Diego, CA 92130			ELPENORD, CANDAL	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/734,535

**Applicant(s)**

PORAT ET AL.

**Examiner**

CANDAL ELPENORD

**Art Unit**

2416

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 5, 7-8 and 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 9, 11-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/088)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Response to Arguments***

1. Applicant's arguments filed November 18, 2008 have been fully considered but they are not persuasive.
2. Claims 1-2 have been amended.
3. The Applicant argument concerning the anticipatory rejection of claim 6 in view Badri '979 is not persuasive because Badri '979 does in fact teach frequency diversity that overcomes multipath fading on the multicarrier (i.e. OFDM) channel as will be explained below. Badri '979 teaches transmitting the same information symbol on multiple carriers separated by a time interval including insertion of a time interval to avoid multicarrier symbol interference as recited in col. 3, lines 44-53, col. 10, lines 29-51, col. 3, lines 62 to col. 4, lines 19, col. 9, lines 29-47.

In view of the above reasons, the anticipatory rejection is maintained.

4. The Applicant further alleged the combination of Kleider '252 and Badri '979 would not have enabled one skilled in the art to arrive at the claimed invention with respect to claims 9, 12-13.
5. In response, the Examiner respectfully disagrees because the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of

ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In this case, the Examiner asserts the combination when considered as a whole clearly teaches the Applicant claimed invention.

***Claim Rejections - 35 USC § 101***

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**Claims 1-4, 11** are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101"). The instant claims 1-4, 11 neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Furthermore, the claims (i.e., particularly claim 1) recite purely mental steps (transmitting, receiving and changing data) without tying the steps to one of the four statutory categories of invention recited in USC § 101.

Claims 3-4, 11 are rejected since they depend from claim 1.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. **Claims 2-4, 11** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 2, the phrase "capable of " renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 3-4, 11 are rejected by virtue of their dependency on claim 2.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. **Claims 2-4, 6** are rejected under 35 U.S.C. 102(e) as being anticipated by Badri et al (US 7,173,979 B1).

**Regarding claim 2**, Badri '979 discloses a method of allocating data bits to multiple carriers for transmission (see, "method for transmitting information symbols using a plurality of carriers" "transmission symbols allocated to the information symbol", col. 3, lines 44-53), each carrier representing at least one selecting a data bit from a message (see, "carrier modulated with transmission symbol", col. 3, lines 56-59); selecting a symbol to represent the selected data bit (see, generating of a transmission symbol, from an information symbol which then transmitted using a plurality of carriers, col. 3, lines 63 to col. 4, lines 10); redundantly assigning the symbol to a plurality of carriers (see, mapping diversity where multiple representation of the information symbol on the carriers, col. 19, lines 29-34) comprising the steps of: assigning the symbol to a first carrier (see, the first transmission symbol which derived from an information symbol is transmitted via a first carrier, col. 10, lines 34-44); assigning the symbol to a second carrier ("second transmission symbol via the 32<sup>nd</sup> carrier", col. 10, lines 34-44) with a first carrier spacing from the first carrier (1<sup>st</sup> and second time interval", recited in col. 3, lines 43-61, "difference between the transmission symbol", recited in col. 3, lines 62- col. 4, lines 20; assigning the symbol to a third carrier ("the third transmission symbol via 128th carrier", col. 10, lines 34-44) with a second carrier spacing from the second carrier that is different from the first carrier spacing (1<sup>st</sup> and second time interval", recited in col. 3, lines 43-61, "difference between the transmission symbol", recited in col. 3, lines 62- col. 4, lines 20); and repeating the steps of selecting data bits and selecting a symbol to bits carriers (see, generating of a transmission symbol from an information symbol which then transmitted using a plurality of carriers, col. 3, lines 63 to

col. 4, lines 10, see bits of the information symbols, col. 8, lines 56-58) wherein the assignment of symbols to carriers produces non-uniform spacing of carriers modulated by the same symbols (see, modulating of transmission symbol on first and second carrier at 1st and second time, col. 4, lines 53-65); and wherein the method allocates data bits to multiple carriers for transmission(see. "method for transmitting information symbols using a plurality of carriers" "transmission symbols allocated to the information symbol", col. 3, lines 44-53), each carrier capable of being modulated with at least one symbol representing at least on data bit (see, "carrier modulated with transmission symbol", col. 3, lines 56-59).

**Regarding claim 3**, Badri '979 discloses the method wherein each carrier spacing for each symbol data is different from every other carrier spacing for the symbol (1<sup>st</sup> and second time interval", recited in col. 3, lines 43-61, "difference between the transmission symbol", recited in col. 3, lines 62- col. 4, lines 20).

**Regarding claim 4**, Badri '979 discloses the method ("transmitting information using plural carriers", recited in abstract, lines 1-7) wherein the ratio of carriers to data bits is 16 ("number of bit to signal constellation and 16 possibilities", recited in col. 7, lines 40 - col. 8, lines 30).

**Regarding claim 6**, a method of transmitting (see. "method for transmitting information symbols using a plurality of carriers" "transmission symbols allocated to the information symbol", col. 3, lines 44-53), the method comprising the steps of:

determining a number of data bits represented by one symbol ("extracting information symbol contained in the transmission symbols", recited in abstract, lines 9-14, see demodulating of the received transmission symbols in order to determine the information symbol, col. 4, lines 33-43); selecting from the message a number of data bits equal to the number of bits represented by the one each symbol (see, bits of the information symbols for transmission of information, col. 8, lines 56-58, "determining the information symbols from the transmission symbols", recited in col. 4, lines 66-col. 5, lines 14); and assigning a portion of the one symbol, the portion representing at least one each data bit ("transmitting the same information symbol four times to a plural carriers such as first carrier, 32<sup>nd</sup> carrier, 128<sup>th</sup> carrier, and 256<sup>th</sup> carrier", recited in col. 10, lines 29-51), to a first plurality of carriers and redundantly assigning the same portion of the one symbol to at least a second unique plurality of carriers ("transmitting the same information symbol four times to a plural carriers such as first carrier, 32<sup>nd</sup> carrier, 128<sup>th</sup> carrier, and 256<sup>th</sup> carrier", recited in col. 10, lines 29-51), wherein the frequency separation ("difference of timing from first transmission to second transmission symbol", recited in col. 3, lines 62-col. 4, lines 19) of the first plurality of carriers and the second plurality of carriers is non-uniformly distributed over a set of available frequencies upon which the first and second plurality of carriers are transmitted ("insertion of a protection interval in order to avoid interference of neighboring symbols", recited in col. 9, lines 29-47-since the symbols are orthogonal to each other, hence frequency diversity is achieved, therefore non-uniform).



***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. **Claims 1** is rejected under 35 U.S.C. 103(a) as being unpatentable over Badri et al (US 7,173,979 B1) in view of Korobkov et al (US 7,206,350 B2).

**Regarding claim 1**, Badri '979 discloses a method (see, transmission of transmission symbol four times using plural carriers which creates frequency diversity, col. 10, lines 34-44, and avoid interference/counteracting destructive interference on the multicarrier symbol, col. 14, lines 11-13), the method comprising assigning redundant symbols ("transmitting of information symbol using a plurality of carries", recited in col. 3, lines 43-61, and "allocated to the information channel") to a plurality of carriers ("carriers such as first carrier, 32<sup>nd</sup> carrier, 128<sup>th</sup> carrier, and 256<sup>th</sup> carrier", recited in col. 10, lines 29-51), each such redundant symbol representing the same data bits of a message in the same way (see, "transmitted transmission symbols based on the same information symbol", col. 12, lines 61-64) and modulating the redundant symbols onto to a plurality of carriers to create a non-uniform carrier assignment (see, "modulating the first and second symbol on carrier", col. 4, lines 14-20) wherein frequency intervals between carriers assigned to a data bit are different for each interval (1<sup>st</sup> and second time interval", recited in col. 3, lines 43-61, "difference between the transmission symbol", recited in col. 3, lines 62- col. 4, lines 20).

Badri '979 discloses all the claimed limitation with the exception of being silent with respect to claimed features: wherein the method creates frequency diversity in a multicarrier OFDM signal to overcome impairment caused by periodic nulls in a multipath channel.

However, Korobkov '350 from the same field of endeavor discloses the above claimed features:

**Regarding claim 1**, wherein the method creates frequency diversity in a multicarrier OFDM signal to overcome impairment caused by periodic nulls in a multipath channel (noted: avoiding multicarrier interference based on null situated at sub-carrier frequencies, col. 1, lines 24-31, see, mitigating selective fading using frequency diversity, col. 3, lines 4-38).

In view of the above, having the method and device for transmitting information symbols using plurality of sub-carriers of Badri '979, and the OFDM communication method and system of Korobkov '350, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Badri '979 by using features as taught by Korobkov '350 in order to prevent destructive interference on the multicarrier channel as suggested in col. 3, lines 4-10.

14. **Claims 11-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Badri et al (US 7,173,979 B1) in view of Tager et al (US 6,751,262 B1).

Badri '979 discloses all the claimed limitation with the exception of being silent with respect to claimed features: regarding claims 11-12, the method, wherein some of the carriers are zeroed out to avoid interference resulting from the transmitted.

However, Tager '262 from the same field of endeavor discloses the above claimed features: the method wherein some of the carriers are zeroed out ("zero crossings where the carrier frequencies can not overlap each other", recited in col. 2, lines 29-67) to avoid interference resulting from the transmitted ("use of zero crossing of carrier frequencies to eliminate interference", recited in col. 2, lines 26-67).

In view of the above, having the method and device for transmitting an information symbol using plurality of carriers of Badri '979 and OFDM data transmission of Tager '262, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Badri '979 by using features as taught by Tager '262 in order eliminate carrier interference in an OFDM system.

15. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kleider et al (US 6,487,252 B1) in view of Badri et al (US 7,173,979 B1).

**Regarding claim 9**, Kleider '252 discloses an OFDM modulator (fig. 1, Modulator 14, col. 2, lines 37-43) for transmitting a binary data word in a symbol having frequency diversity comprising: a ramp counter for producing a series of bin number values (fig. 1, Pilot Sequence Generator 18 producing a plurality of pilot tone to frequency bins, col. 2, lines 55-62, col. 3, lines 47-54); a look up table (fig. 2, Frequency Bin Assignment Table 110) for mapping the bin number values to bit select values (see, assignment of pilot tone to the frequency bins, col. 4, lines 46-50), the look up table comprising entries that produce an assignment of bits to carriers (fig. Frequency Bin Assignment Table 110 with frequency bin locations, col. 3, lines 47-51, lines 58-63), the assignment resulting in bits being repeated over a selection of carriers that have a non-uniform distribution over a set of available frequencies upon which the carriers are transmitted.

Kleider '252 discloses all the claimed limitation with the exception of being silent with respect to claimed features: the assignment resulting in bits being repeated over a

selection of carriers that have a non-uniform distribution over a set of available frequencies upon which the carriers are transmitted.

Badri '979 from the same field of endeavor discloses the above claimed features: the assignment resulting in bits being repeated over a selection of carriers that have a non-uniform distribution over a set of available frequencies upon which the carriers are transmitted ("transmitting of information symbol using a plurality of carries", recited in col. 3, lines 43-61, and "allocated to the information channel", "transmitting the same information symbol four times to a plural carriers such as first carrier, 32<sup>nd</sup> carrier, 128<sup>th</sup> carrier, and 256<sup>th</sup> carrier", recited in col. 10, lines 29-51, "difference of timing from first transmission to second transmission symbol", recited in col. 3, lines 62-col. 4, lines 19).

In view of the above, having the orthogonal frequency division multiplexed wideband communication system of Kleider '252 and the method and device for transmitting an information symbol using plurality of carriers of Badri '979, it would have been obvious to one of ordinary skill in the art at the time to modify the features of Kleider '252 by using the teaching features of Badri '979. The motivation for doing so would be to transmit an information symbol using a plurality of carriers in order to create frequency diversity so that the original signal can be obtained at the receiving end as suggested in col. 4, lines 34-42.

16. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kleider et al (US 6,487,252 B1) in view of Badri et al (US 7,173,979 B1) as applied to claim 13 above, and further in view of Tager et al (US 6,751,262 B1).

Kleider '252 and Badri '979 disclose all the claimed limitation with the exception of being silent with respect to claimed features: **regarding claim 13**, the OFDM modulator further comprising means for disabling I and Q carrier amplitudes for a particular carrier and zeroing the transmitted energy for the carrier.

However, Tager '262 from the same field of endeavor discloses a method comprising means for disabling the I and Q carrier amplitudes for a particular carrier ("zero crossings where the carrier frequencies can not overlap each other", recited in col. 2, lines 29-67), and zeroing ("zero crossings where the carrier frequencies can not overlap each other", recited in col. 2, lines 29-67) the transmitted energy for the carrier ("use of zero crossing of carrier frequencies to eliminate interference", recited in col. 2, lines 26-67).

In view of the above, having the orthogonal frequency division multiplexed wideband communication system of Kleider '252, the method and device for transmitting an information symbol using plurality of carriers of Badri '979 and the teaching features of Tager '262, it would have been obvious to one of ordinary skill in the art at the time to modify the features of Kleider '252 with Badri '979 by using features as taught by Tager '262 in order prevent carrier interference in an OFDM system.

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Baum et al (US 2002/0085641 A1) and Shattil et al (US 2003/0147655 A1).

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Bin Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Candal Elpenord/

Examiner, Art Unit 2416

/Kwang B. Yao/

Supervisory Patent Examiner, Art Unit 2416